

Title Impact of a decontamination step with peroxyacetic acid on the shelf-life, sensory quality and nutrient content of grated carrots packed under equilibrium modified atmosphere and stored at 7 °C

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Abstract

Peroxyacetic acid (PAA) is a strong oxidizer and exerts antimicrobial properties. The effect of a decontamination step with 80 and 250 mg L⁻¹ PAA on shelf-life of grated carrots stored under equilibrium modified atmospheric packaging at 7 °C was determined and compared with the shelf-life of unwashed and water-washed carrots. Microbial parameters, including total aerobic plate count, numbers of lactic acid bacteria, *Lactobacillae* and yeasts, and sensory quality were evaluated. Next to these parameters, atmospheric gas composition, pH and nutrient content were also monitored. The suggested packaging configuration prevented CO₂ accumulation, but at the end of the study anoxic conditions were reached for unwashed carrots and carrots washed with 80 mg L⁻¹ PAA. The microbial shelf-life of water-washed carrots was 4 d based on the yeast count, whereas the flavour was not acceptable after 5 d. The total aerobic plate count and the yeast count determined the shelf-life of carrots treated with 80 mg L⁻¹ PAA on 5 d, whereas the flavour was unacceptable after 7 d. None of the microbial parameters determined the shelf-life of carrots washed with 250 mg L⁻¹ PAA. However, this treatment had already a pronounced adverse effect on the initial sensory quality. Water washing already decreased the content of all individually studied nutrients (-16 to -28%), except for lutein content and the antioxidant capacity. Additional losses after adding PAA on day 0 were found for α -tocopherol and phenols. Regardless of the applied treatment, α - and β -carotene remained stable during storage, whereas ζ -carotene, lutein and α -tocopherol were unstable. The phenol content and the antioxidant capacity of unwashed, water-washed and 80 mg L⁻¹ PAA-treated carrots increased significantly at the end of the storage period, whereas no changes were found in carrots treated with 250 mg L⁻¹ PAA. On the condition that carrots were packed under an adequate EMA, the 80 mg L⁻¹ PAA treatment showed possibilities for extending shelf-life without pronounced effects on nutrient content.